

Studying Biological Rhythms of Person's Skin-Galvanic Reaction and Dynamics of Light Transmission by Isomeric Substance in Space Flight Conditions

**e-mail: vladimir.v@nt-ftlg.com
vladimir.p@nt-ftlg.com**

Phone: (919) 942-9241

Fax: (919) 942-9241

General substantiation

1. State of the Question. Novelty and Practical Value of the Research.

Intensity and amplitude of human functional systems and human most important organs are wavelike, rhythmic by nature. These waves have constant periodicity, phase and amplitude. The mentioned characteristics can vary, however their variations have a pronounced reiteration in the course of time. This indicates a hashing of several wave processes and their interference. Stochastic changes in wave processes characteristics of a human organism are explained either by “pulsations” associated with hashing (superposition) of several wave processes and their interference, or by single influence of environmental physical factors on a human organism.

Human beings have respectively periods of higher and lower efficiency, state of health and so on, depending not only of environmental factors, but also of “internal” rhythmic factor. Sometimes peaks and falls periodicity of some or other characteristics is broken. Disturbance of steady-state biological rhythms is usually accompanied by reduction of activity steadiness of the most important systems of a human organism. In its turn this has an effect on organism's adaptation to changing living conditions as well as on general condition and efficiency of a human being. The latter factor is very important for space medicine.

Biological rhythmology is a special branch of biology and medicine, it studies rhythmic activity mechanisms of organs, their systems, individuals and species. Appropriate researches were also carried out in space medicine.

Some or other rhythmical processes are attributable to all living substances of our planet. Such processes are observed in all organisms –from unicellular algae to human organism – concerning both the whole organism as well as its separate cells. The majority of biological rhythms is probably not conditioned by periodic environmental effects, but it is subjected to some unknown biological clock. This rhythm mechanism does not simply respond to external stimulations, but it adapts itself to the external environment in a finer and more expanded manner, since necessary preparatory reactions take place in living organism before changing of external conditions, for example before it gets dark. Synchronization of a great number 400 of human organism's functional parameters changing rhythmically during one circadian period can be only explained by existence of such biological clock. However, the biological clock was not found both in organisms of all levels and in its separate cells. There is another striking fact – biological rhythms of hundreds millions of cornfield spikelets are strictly synchronized with each other. This field is not though an entire organism. Striking accuracy of observed rhythms gives an idea that there is nevertheless some periodically changing geophysical or cosmic environmental factor, which constantly “informs” plants and animals about the course of time.

In 1973-1974 V.P.Glushko advanced a hypothesis that if such factor existed, it could be found out through its influence on a lifeless inert matter. Such factor was discovered during synchronous

experiments with plants and isomer solutions. It was indicated by high coefficient of correlation between 24 hours' light absorption by lamina of a living plant and dynamics of light transmission through an isomer solution. Such factor turned to be a gravitational field, namely – gravitational perturbations (waves) going from the center of our Galaxy. The report on this work was given at “Problems of Plants Photo Energy” All-Union Conference held in Almaty in 1974 and at “Magnetic Fields in Medicine and Biology” International Conference held in Kaliningrad in 1975.

Authors' group V.P.Glushko, R.A.Gareev and A.N.Startsev gave a report on profound correlation between 24 hours' dynamics of person's psychophysiologic state and 24 hours' dynamics of light dispersion through isomer solutions, at the first Worldwide Aerospace Congress held in Moscow in 1995. It was there stated a hypothesis that a psychophysiologic state of an astronaut situated at a space station depends not only on already known space flight factors, such as zero-gravity, smells, sounds, electromagnetic noise of equipment, psychological and other so-called “internal” space flight factors, but it depends also on external factors such as gravity waves frequency variation resulted by Doppler effect, i.e. waves initiating biological rhythms. Initiating signal's frequency variation “disturbs” a biological rhythm of the organism and this has to influence on the whole astronaut's organism. Frequency variation of the signal initiating biological rhythm cannot be in principle simulated at the planet's surface, but this occurs naturally during space flight.

“*Tangr – 2*” space experiment held in 1998 and elicited the fact that T.Musabayev, an astronaut showed biological rhythms of skin-galvanic reaction shortened in time by 5-8% in comparison with similar rhythms registered on the Earth. **Mathematical processing of results of measurements was done by "Institute of theoretical and applied mathematics of the Ministry of a science - academy of sciences of Republic Kazakhstan**». The above said researches (3 experiments, each lasting for 3 hours with registration at intervals of a minute) were carried out after astronauts of 25-th expedition had spent about 3 or 4 months at “*Mir*” orbital station; i.e. after the period of critical adaptation to zero gravity and specific living environment existed at the orbital station. **Results of work are published in the collective monography «Space researches in Kazakhstan», under edition of academician M.M.Sultangazin, Almaty, year 2002. Section 5.12, «The Medical and biologic researches connected to flights of the Kazakhstan cosmonauts», page 446 - 460. And as in the collection of works the 2-nd international scientific - practical conference «The Science and education at the present stage of development of a society». Almaty, year 2003, page 72 - 73. Authors: Gareyev R.A., Fajzulina S.R., Glushko V.P., of the name: «The Psychophysical condition of the cosmonaut to KGR parameter during the period after-flight's rehabilitations».**

New Technologies of Physicotechnical Laboratory "GLUSHKO" will congregate to continue the begun researches. It is supposed to study out dynamics variation of “rhythms” of optical properties of isomer solutions situated both in space flight, as well as on the planet's surface. This will greatly contribute to resolving question about biological rhythms mechanism and its properties. If we evolve the hypothesis about a space factor initiating biological rhythms, it will be clear that there is not life as such outside the spatial region where this factor operates. This work is topical for pilot cosmonautics not only in view of the above-mentioned, but also in view of the knowledge about degree of dependence of biological clock's “course speed” on spacecraft's traverse speed after signal frequency has varied as a result of Doppler effect, as well as the knowledge about possibility of their disalignment.